

The 2011 Floods in North Dakota

The Response Efforts of the USGS North Dakota Water Science Center



Introduction

On April 6, 2011, warmer-than-expected temperatures, combined with some light rain, initiated the melt process. Soon, record-breaking floodwaters came coursing down the Missouri, Red, and Souris Rivers, leading to massive flooding and even forcing some North Dakotans to flee their homes. From the beginning, the USGS North Dakota Water Science Center was prepared to meet the floods, and from April until the floodwaters began to abate in July, USGS crews worked tirelessly to provide accurate, up-to-date information for the first-responders to mitigate the effects of the 2011 floods.

Record-Breaking Floods

The 2011 Floods broke records throughout the state. The Missouri, James, Sheyenne, and Mauvais Coulee Rivers all set record peaks, with streamgages recording for more than 60 years. The Red and Souris Rivers both set second-highest records in the more than 100 years USGS streamgages have been monitoring them.

Whole Effort

For the entirety of the flood response, the USGS put forth its whole effort. Every field scientist, every boat, every vehicle, and every available piece of equipment were deployed to collect critical information. USGS crews worked seven days a week as long as necessary to ensure that flood managers and first responders had the information they needed to make the best decisions possible. More than 35 additional streamgages were deployed to increase the monitoring coverage across the flooding rivers. Two webcams were also installed at Fargo and Grand Forks to provide real-time updates of conditions in those cities.

In addition, USGS crews from out of state came to supplement the North Dakota Water Science Center. Scientists and technicians from the Arkansas, Colorado, Montana, Nebraska, and Iowa came and spent weeks working with the North Dakota Water Science Center to ensure complete coverage of the flooding areas while allowing more focus to be placed on the points of most severe flooding.

Souris River

By April 8, 2011, USGS streamgages on the Souris River Basin began registering flooding. The North Dakota Water Science Center deployed additional gages to broaden and intensify coverage, and also began extensive data collection, including streamflow and depth of the river. The Souris River continued to rise until, by June 3, several USGS streamgages that had been in operation for more than 70 years registered record peaks. To help the U.S. Army Corps of Engineers in its efforts to manage such historic water levels, the North Dakota Water Science Center sent crews out to help verify Army Corps streamflow measurements using USGS equipment and streamgages. By June 22, the levees of the town of Minot, North Dakota, began failing, and evacuations were ordered for large sections of the city. By July 1, the Souris River had peaked at 27.9 feet, more than two and a half feet higher than the previous record in 1976.

Red River

In advance of what was expected to be higher-than-normal flooding, the North Dakota Water Science Center partnered with the Army Corps to deploy 20 additional streamgages around the city of Fargo. These gages became crucial to the water monitoring effort when, by April 8, the Red River and its tributaries began flooding. By mid-April, the Red River had crested at both Fargo and Grand Forks, with USGS streamgages recording the third-highest and second-highest peaks respectively for more than 100 years.

Missouri River

Early April also saw the Missouri River reaching flood stage throughout North Dakota. USGS streamgages and crews worked to ensure the Army Corps had accurate and comprehensive river level and streamflow information as the Missouri continued to rise. By May 12, the Missouri River reached the 4th highest level ever recorded at Garrison Dam, since the dam came online in 1953. By June 1, the Missouri River broke the highest recorded level at Garrison Dam

when it reached 87,300 cubic feet per second. However, USGS streamgages continued to monitor significant rises in streamflow, until the Missouri River crested on June 22 at 152,000 cubic feet per second, more than twice the previous record, which was set in 1976.

Partners

Army Corps of Engineers: The USGS worked closely with the Army Corps to provide comprehensive streamflow and river depth information throughout all of the flooding areas. USGS streamgage information was crucial to verify the decisions made by the Army Corps in its efforts to manage the record-breaking floodwaters that impacted all of North Dakota.

National Weather Service: USGS streamgage information is critical to the National Weather Service to make its flooding predictions. The Weather Service takes its weather prediction data and pairs it with USGS streamgage data to make its flood forecasts.

The North Dakota Department of Transportation: On June 1, the North Dakota Department of Transportation requested the assistance of USGS to determine the levels of scour, or water damage, to six bridges on the Missouri River and one bridge on the Yellowstone River, resulting from the massive floodwaters coursing through those rivers.

The North Dakota State Water Commission: On July 1, the North Dakota State Water Commission requested that the USGS undertake a hydrographic survey of a 14-mile stretch of the Missouri River around Bismarck in order to determine what the effects of the floodwater might have on the depths and currents of the Missouri.

Canada: Beginning on April 14, USGS streamgage data was used by various river management agencies in Canada to help determine how and when to release water from control structures on the Souris River as the floodwaters made their way from the U.S. to Canada.



Flooding on the Souris River near in Downtown Minot, N.D.